

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VI Examination-Nov/Dec-2011

Subject code: 162604

Date: 28/11/2011

Subject Name: Characterization of Rubber

Time: 10.30 am -1.00 pm

Total marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Answer the following
- i** Write down the full form of following: **04**
(1) EGA (2) TOA (3) TCL (4) ANSI
- ii** Why is it necessary to store the rubber product at standard condition? **03**
Which ISO standard is used for the same?
- Q.1 (b)** Discuss in detail about the Thermogravimetric Analysis. **07**
- Q.2 (a)** How is characterization of rubber done by Lassalagne sodium fusion method? **07**
- Q.2 (b)** Answer the following
- i** Write down the procedure to determine the chloroform extract of rubber vulcanizate. **05**
- ii** List the different methods which are preferred to compare different lots and batches of rubber. **02**
- OR**
- Q.2 (b)** Answer the following
- i** Write down the procedure to determine the acetone extract of rubber vulcanizate. **05**
- ii** List the chemicals used to determine free sulphur present in rubber vulcanizate. **02**
- Q.3 (a)** Discuss any three applications of Differential Scanning Calorimetry in the field of rubber. **07**
- Q.3 (b)** Answer the following
- i** How the concentration of clustered water present in the polymer is measured? Explain it with suitable example. **05**
- ii** Explain the term Oxidative Induction Time. **02**
- OR**
- Q.3 (a)** Compare the Differential Thermal Analysis with Differential Scanning Calorimetry. **06**
- Q.3 (b)** Answer the following
- i** Define the following terms: (1) Complex Modulus (2) Storage Modulus **04**
(3) Loss Modulus (4) Phase Angle
- ii** Which method is used to determine the concentration of carbon black in resin? Explain it with suitable example. **04**

- Q.4 (a)** Write a short note on liquid-liquid chromatography. **06**
- Q.4 (b)** Answer the following
- i** How an average recovery efficiency of hydrocarbon is calculated using Gas Chromatography? **03**
 - ii** Which characteristic information with respect to rubber is obtained by Microscopy? **05**
- OR**
- Q.4 (a)** Write a short note on Thin Layer Chromatography. **07**
- Q.4 (b)** Answer the following
- i** What do you mean by carrier gas? Is oxygen suitable as carrier gas? **02**
 - ii** Summarize the components of Electron Microscope. **05**
- Q.5 (a)** Answer the following
- i** Explain the term Microscopy. Give its classification. **02**
 - ii** Write a short note on Small Angle X-ray Scattering. **05**
- Q.5 (b)** Explain the construction and working of single beam spectrophotometer. **07**
- OR**
- Q.5 (a)** Answer the following
- i** Explain the term secondary electrons. **02**
 - ii** Write a short note on Wide Angle X-ray Scattering. **05**
- Q.5 (b)** Discuss the various types of transitions take place during ultraviolet spectrometry. **07**
